Amendments to the Specification:

Please replace paragraph **[0028]** with the following amended paragraph:

Referring now to FIG. 1A, a representative jaw 100 includes sixteen teeth, at least some of which are to be moved from an initial tooth arrangement to a final tooth arrangement. To understand how the teeth may be moved, an arbitrary centerline (CL) is drawn through one of the teeth 102. With reference to this centerline (CL), the teeth may be moved in the orthogonal directions represented by axes 104, 106, and 108 (where 104 is the centerline). The centerline may be rotated about the axis 108 (root angulation) and 104 (torque) as indicated by arrows 110 and 112, respectively. Additionally, the tooth may be rotated about the centerline~~, as represented by arrow 114~~. Thus, all possible free-form motions of the tooth can be performed.

Please replace paragraph **[0030]** with the following amended paragraph:

One tool for a incrementally repositioning the teeth in a patient's jaw is a set of one or more adjustment appliances. Suitable appliances include any of the known positioners, retainers, or other removable appliances which are used for finishing and maintaining teeth positions in connection with conventional orthodontic treatment. As described below, a plurality of such appliances can be worn by a patient successively to achieve gradual tooth repositioning. A particularly advantageous appliance is the appliance **[[100]]** 101, shown in FIG. 1C, which typically comprises a polymeric shell having a cavity shaped to receive and resiliently reposition teeth from one tooth arrangement to another tooth arrangement. The polymeric shell typically fits over all teeth present in the upper or lower jaw. Often, only some of the teeth will be repositioned while others will provide a base or anchor region for holding the repositioning appliance in place as it applies the resilient repositioning force against the tooth or teeth to be repositioned. In complex cases, however, many or most of the teeth will be repositioned at some point during the treatment. In such cases, the teeth which are moved can also serve as a base or anchor region for holding the repositioning appliance. The gums and the palette also serve as an

anchor region in some cases, thus allowing all or nearly all of the teeth to be repositioned simultaneously.

Please replace paragraph **[0031]** with the following amended paragraph:

The polymeric appliance **[[100]]** 101 of FIG. 1C is preferably formed from a thin sheet of a suitable elastomeric polymeric, such as Tru-Tain 0.03 in. thermal forming dental material, marketed by Tru-Tain Plastics, Rochester, Minnesota 55902. In many cases, no wires or other means are provided for holding the appliance in place over the teeth. In some cases, however, it is necessary to provide individual attachments on the teeth with corresponding receptacles or apertures in the appliance 100 so that the appliance can apply forces that would not be possible or would be difficult to apply in the absence of such attachments.

Please replace paragraph **[0057]** with the following amended paragraph:

Fig. 7 shows an original high resolution model 250 of a group of lower teeth and various compressed models of the high resolution model of the teeth. The original high resolution model requires 2.373 megabytes of data. In comparison, a 20x20 model 252 requires 93 kilobytes, a 30x30 model 254 requires 135 kilobytes, and a 40x40 model 256 requires 193 kilobytes. The reduction in the size of the file reduces the storage as well as transmission requirements while maintaining good quality. At least one orthodontist had noted that the 30x30 model is, for his application, as good as the original high resolution model 250 in developing a treatment plan.

Please replace paragraph **[0074]** with the following amended paragraph:

Once the intermediate and final data sets have been created and reviewed by an orthodontist or suitably trained person, the appliances may be fabricated as illustrated in FIG. 8. Common fabrication methods employ a rapid prototyping device **[200]** 201 such as a stereolithography machine. A particularly suitable rapid prototyping machine is Model SLA-250/50 available from 3D System, Valencia, California. The rapid prototyping machine **[200]**

201 selectively hardens a liquid or other non-hardened resin into a three-dimensional structure which can be separated from the remaining non-hardened resin, washed, and used either directly as the appliance or indirectly as a mold for producing the appliance. The prototyping machine **[200]** 201 receives the individual digital data sets and produces one structure corresponding to each of the desired appliances. Generally, because the rapid prototyping machine **[200]** 201 may utilize a resin having non-optimum mechanical properties and which may not be generally acceptable for patient use, the prototyping machine typically is used to produce molds which are, in effect, positive tooth models of each successive stage of the treatment. After the positive models are prepared, a conventional pressure or vacuum molding machine is used to produce the appliances from a more suitable material, such as 0.03 inch thermal forming dental material, available from Tru-Tain Plastics, Rochester, Minnesota 55902. Suitable pressure molding equipment is available under the trade name BIOSTAR from Great Lakes Orthodontics, Ltd., Tonawanda, New York 14150. The molding machine **[250]** 251 produces each of the appliances directly from the positive tooth model and the desired material. Suitable vacuum molding machines are available from Raintree Essix, Inc.

Please replace paragraph **[0077]** with the following amended paragraph:

FIG. 9 is a simplified block diagram of a data processing system **[300]** 311 that may be used to develop orthodontic treatment plans. The data processing system **[300]** 311 typically includes at least one processor **[302]** 303 which communicates with a number of peripheral devices via bus subsystem **[304]** 305. These peripheral devices typically include a storage subsystem **[306]** 307 (memory subsystem **[308]** 309 and file storage subsystem 314), a set of user interface input and output devices 318, and an interface to outside networks 316, including the public switched telephone network. This interface is shown schematically as "Modems and Network Interface" block 316, and is coupled to corresponding interface devices in other data processing systems via communication network interface 324. Data processing system **[300]** 311 could be a terminal or a low-end personal computer or a high-end personal computer, workstation or mainframe.

Please replace paragraph **[0080]** with the following amended paragraph:

Storage subsystem **[306]** 307 maintains the basic required programming and data constructs. The program modules discussed above are typically stored in storage subsystem **[306]** 307. Storage subsystem **[306]** 307 typically comprises memory subsystem **[308]** 309 and file storage subsystem 314.

Please replace paragraph **[0081]** with the following amended paragraph:

Memory subsystem **[308]** 309 typically includes a number of memories including a main random access memory (RAM) 310 for storage of instructions and data during program execution and a read only memory (ROM) 312 in which fixed instructions are stored. In the case of Macintosh-compatible personal computers the ROM would include portions of the operating system; in the case of IBM-compatible personal computers, this would include the BIOS (basic input/output system).

Please replace paragraph **[0084]** with the following amended paragraph:

Bus subsystem **[304]** 305 is shown schematically as a single bus, but a typical system has a number of buses such as a local bus and one or more expansion buses (e.g., ADB, SCSI, ISA, EISA, MCA, NuBus, or PCI), as well as serial and parallel ports. Network connections are usually established through a device such as a network adapter on one of these expansion buses or a modem on a serial port. The client computer may be a desktop system or a portable system.

Please replace paragraph **[0085]** with the following amended paragraph:

Scanner 320 is responsible for scanning casts of the patient's teeth obtained either from the patient or from an orthodontist and providing the scanned digital data set information to data processing system **[300]** 311 for further processing. In a distributed environment, scanner 320 may be located at a remote location and communicate scanned digital data set information to data processing system **[300]** 311 via network interface 324.

Please replace paragraph **[0086]** with the following amended paragraph:

Fabrication machine 322 fabricates dental appliances based on intermediate and final data set information received from data processing system **[300]** 311. In a distributed environment, fabrication machine 322 may be located at a remote location and receive data set information from data processing system 300 via network interface 324.